



Studying low-mass stars in the VO... and other things! (yet another change of title)

Amelia Bayo (transiting from MPIA to Valparaiso)

Disclaimer: Blames are more likely on me...

good ideas, if any, most likely coming from Enrique Solano or Carlos Rodrigo



Outline

From a hybrid-user perspective (very biased, and not pretending AT ALL to be complete):

- What kind of science cases have benefited HUGELY from the VO initiative?
- Where is ample room for improvement?
- Could I make some suggestions?

The happy endings...

- Data related:
 - CDS wonders vs pain of getting, for example, ApJS IOP tables

The image shows two overlapping windows from a desktop environment. The left window is titled 'VizieR Catalogue Service' and contains a search interface. The right window is titled 'TOPCAT(33): Table Browser' and displays a table of astronomical data.

VizieR Catalogue Service Interface:

- Server: `http://vizier.u-strasbg.fr/`
- Row Selection:
 - Cone Selection
 - Object Name: Resolve
 - RA: degrees (2000)
 - Dec: degrees (2000)
 - Radius: degrees
 - All Rows
 - Maximum Row Count: 50000
- Column Selection:
 - Output Columns: all
- Catalogue Selection:
 - By Category | By Keyword | Surveys | Missions
 - Keywords: `//A+A/560/A76`
 - Sub-Table Details Include Obsolete Tables
 - Search Catalogues | Cancel Search
 - Table listing:

Name	Popularity	Density	Description
//A+A/560/A76	1032	0	Catalog of stellar clusters in the inner Galaxy (B

TOPCAT(33): Table Browser Interface:

Table Browser for 33: J_A+A_560_A76_clusters

recno	ID	Name	Cat	CLON
1	1	BH 131	(01),13	300.116
2	2	[MCM2005b] 32	09	300.131
3	3	BH 132	01	300.263
4	4	VVV CL013	14	300.343
5	5	[FSR2007] 1616	11	300.474
6	6	[MCM2005b] 33	09	300.507
7	7	Ruprecht 105	01	300.885
8	8	G3CC 5	17	300.913
9	9	[DBS2003] 77	05	300.966
10	10	VVV CL015	14	300.967
11	11	VVV CL016	14	300.984
12	12	[DBS2003] 78	05	301.118
13	13	VVV CL017	14,17	301.137
14	14	[FSR2007] 1622	11	301.416
15	15	G3CC 6	17	301.643
16	16	NGC 4609	01	301.895
17	17	G3CC 7	17	301.947
18	18	Hogg 15	01	302.047
19	19	VVV CL018	14	302.158
20	20	[MCM2005b] 34	09	302.433
21	21	[FSR2007] 1630	11	302.612
22	22	[DBS2003] 79	05	302.64
23	23	[DBS2003] 80	05	302.806
24	24	Teutsch 109	02	303.652
25	25	G3CC 8	17	303.927
26	26	G3CC 9	17	304.002
27	27	VVV CL019	14	304.805
28	28	[MCM2005b] 35	09	304.845
29	29	VVV CL020	14	304.87
30	30	G3CC 10	17	304.887
31	31	[DBS2003] 82	05	304.928
32	32	[DBS2003] 131	05,17	305.259
33	33	[DBS2003] 130	05	305.269
34	34	VVV CL021	14	305.277
35	35	[DBS2003] 132	05	305.321
36	36	Danks 1	01,17	305.338
37	37	VVV CL022	14	305.362
38	38	[MCM2005b] 36	09	305.383
39	39	Danks 2	01,17	305.392
40	40	VVV CL023	14	305.438

The happy endings...

- Data related:

- CDS wonders vs pain of getting, for example, ApJS IOP tables

The image shows a screenshot of a table browser interface. On the left, a table lists various mathematical relations with columns for ID, Name, Cat, and CLON. On the right, a table lists clusters with columns for ID, Name, Cat, and CLON.

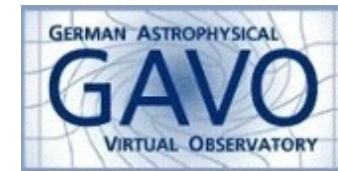
ID	Name	Cat	CLON
1	BH 131	(01),13	300.116
2	[MCM2005b] 32	09	300.131
3	BH 132	01	300.263
4	VVV CL013	14	300.343
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The happy endings...

- Data related:
 - CDS wonders vs pain of getting, for example, IOP tables
 - The “sasmirala” atlas

The happy endings...

Asmus et al 2014



TOPCAT(31): Table Browser

Table Browser for 31: TAP_1_sasmirala.objects

	name	raj2000	dej2000
1	3C 390.3	280.5375	79.77139
2	NGC 1275	49.95083	41.51167
3	NGC 6251	248.13333	82.53778
4	3C 305	222.33989	63.27055
5	NGC 5866	226.62292	55.76333
6	Mrk 266NE	204.57414	48.27806
7	Mrk 266SW	204.57213	48.27556
8	M51a	202.46958	47.19528
9	NGC 4258	184.73958	47.30389
10	Mrk 3	93.90167	71.0375
11	NGC 3147	154.22375	73.40083
12	4C +73.08	147.44108	73.23976
13	M81	148.88833	69.06528
14	UGC 5101	143.965	61.35306
15	NGC 3690E	172.14012	58.56294
16	NGC 3690W	172.12925	58.56131
17	NGC 3998	179.48375	55.45361
18	NGC 3982	179.11708	55.12528
19	NGC 3718	173.14542	53.06806
20	IRAS 08572+3915	135.10583	39.065
21	PKS 2158-380	330.32125	-37.77333
22	NGC 7130	327.08125	-34.95111
23	NGC 7172	330.50792	-31.86972
24	IC 1459	344.29417	-36.46222
25	NGC 7496	347.44708	-43.42806
26	NGC 7552	349.045	-42.58472
27	NGC 7582	349.59792	-42.37056
28	NGC 7590	349.72833	-42.23917
29	NGC 7314	338.9425	-26.05056
30	PKS 2354-35	359.25292	-34.75917
31	ESO 602-25	337.85625	-19.03444
32	MR 2251-178	343.52417	-17.58194
33	Mrk 915	339.19375	-12.54528
34	3C 445	335.95625	-2.10361
35	Mrk 926	346.18125	-8.68583
36	NGC 7592W	349.59084	-4.41574
37	ESO 297-18	24.655	-40.01139

Navigation icons: back, forward, help, close

Description

PKS 2158-380/MCG-6-48-13 is a radio-loud lenticular galaxy at a redshift of $z = 0.0334$ ($D \sim 149$ Mpc) with a Sy 2 nucleus [veron-cetty_catalogue_2010] and was first studied in detail by [fosbury_very_1982]. HST observations revealed three compact but resolved sources in the nucleus instead of one central source (total extend ~ 1 arcsec ~ 0.7 kpc; PA $\sim 90^\circ$; [boyce_faint_1996, zirbel_ultraviolet_1998]). In addition, water maser emission was detected in this object [kondratko_discovery_2006]. No Spitzer data are available for PKS 2158-380, which was imaged with VISIR in the SIC filter in 2006 [van_der_wolk_dust_2010]. A compact MIR nucleus is weakly detected in the image. The low S/N prevents a quantitative analyses of the source morphology but the latter seems different than that seen in HST, as only one source was detected. Our nuclear photometry is consistent with the value in [van_der_wolk_dust_2010].

[boyce_faint_1996] P. J. Boyce, M. J. Disney, F. Macchetto, A. Boksenberg, J. C. Blades, and C. D. Mackay. *Faint object camera observations of complex nuclear structure in PKS 2158-380*, *A&A*, **305** pp. 715, January 1996.

[fosbury_very_1982] R. A. E. Fosbury, A. Boksenberg, M. A. J. Snijders, I. J. Danziger, M. J. Disney, W. M. Goss, M. V. Penston, W. Wamsteker, K. J. Wellington, and A. S. Wilson. *Very extended ionized gas in radio galaxies. I - a radio, optical and ultraviolet study of PKS 2158-380*, *MNRAS*, **201** pp. 991-1008, December 1982.

[kondratko_discovery_2006] P. T. Kondratko, L. J. Greenhill, J. M. Moran, J. E. J. Lovell, T. B. H. Kuiper, D. L. Jauncey, L. B. Cameron, J. F. Gómez, C. García-Miró, E. Moll, I. de Gregorio-Monsalvo, and E. Jiménez-Bailón. *Discovery of water maser emission in eight AGNs with 70 m antennas of NASA's deep space network*, *ApJ*, **638** pp. 100-105, February 2006.

[van_der_wolk_dust_2010] G. van der Wolk, P. D. Barthel, R. F. Peletier, and J. W. Pel. *Dust tori in radio galaxies*, *A&A*, **511** pp. 64, February 2010.

[veron-cetty_catalogue_2010] M.-P. Véron-Cetty and P. Véron. *A catalogue of quasars and active nuclei: 13th edition*, *A&A*, **518** pp. 10, July 2010.

[zirbel_ultraviolet_1998] Esther L. Zirbel and Stefi A. Baum. *The ultraviolet continuum emission of radio galaxies. I. description of sources from the hubble space telescope archives*, *ApJS*, **114** pp. 177, February 1998.

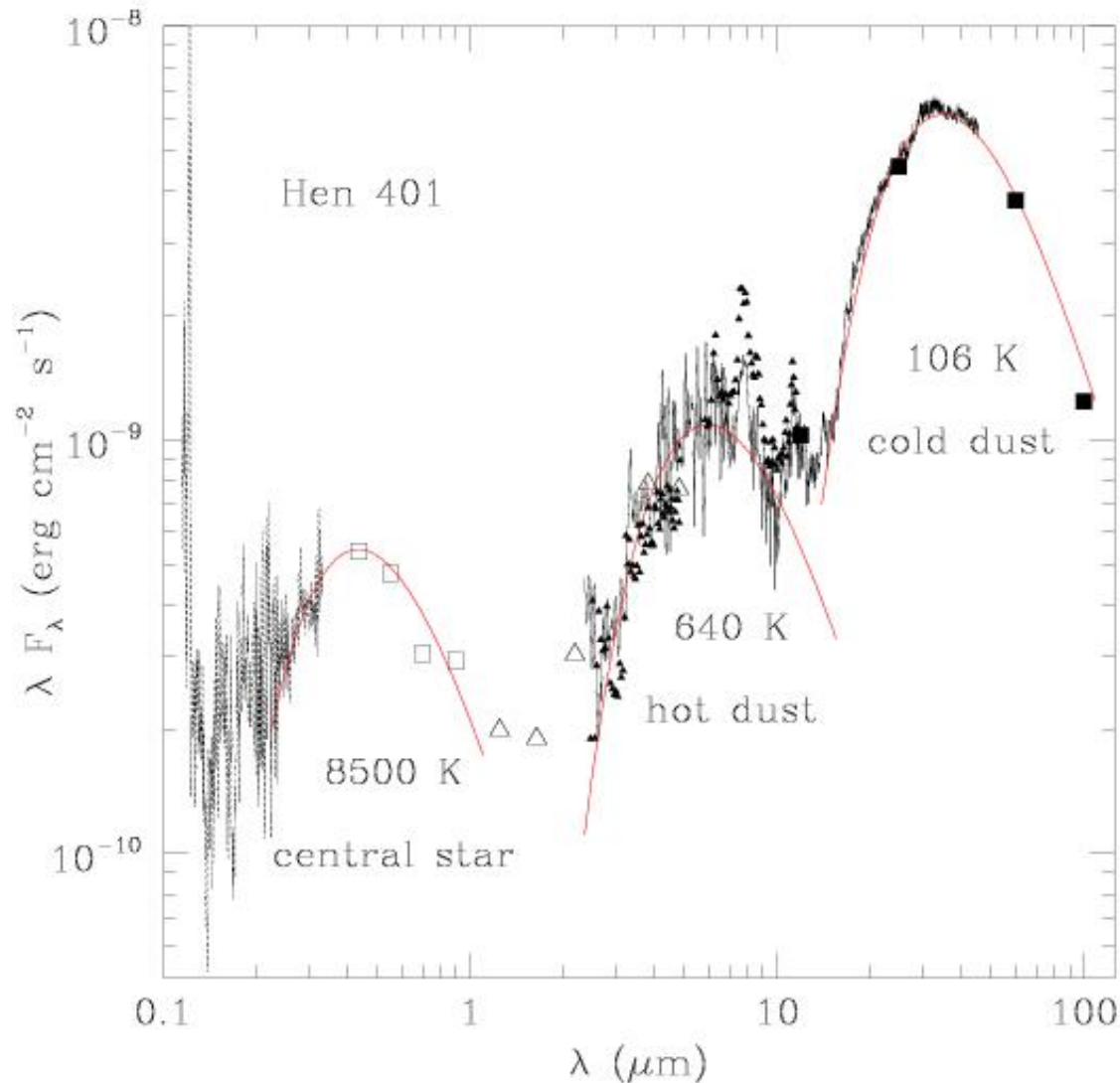
Images

URL: <http://dc.zah.uni-heidelberg.de/sasmirala/q/prod/qp/PKS%202158-380>

The happy endings...

- Data related:
 - CDS wonders vs pain of getting, for example, IOP tables
 - The “sasmirala” atlas
- Tool related (development)
 - The final AVO science demo

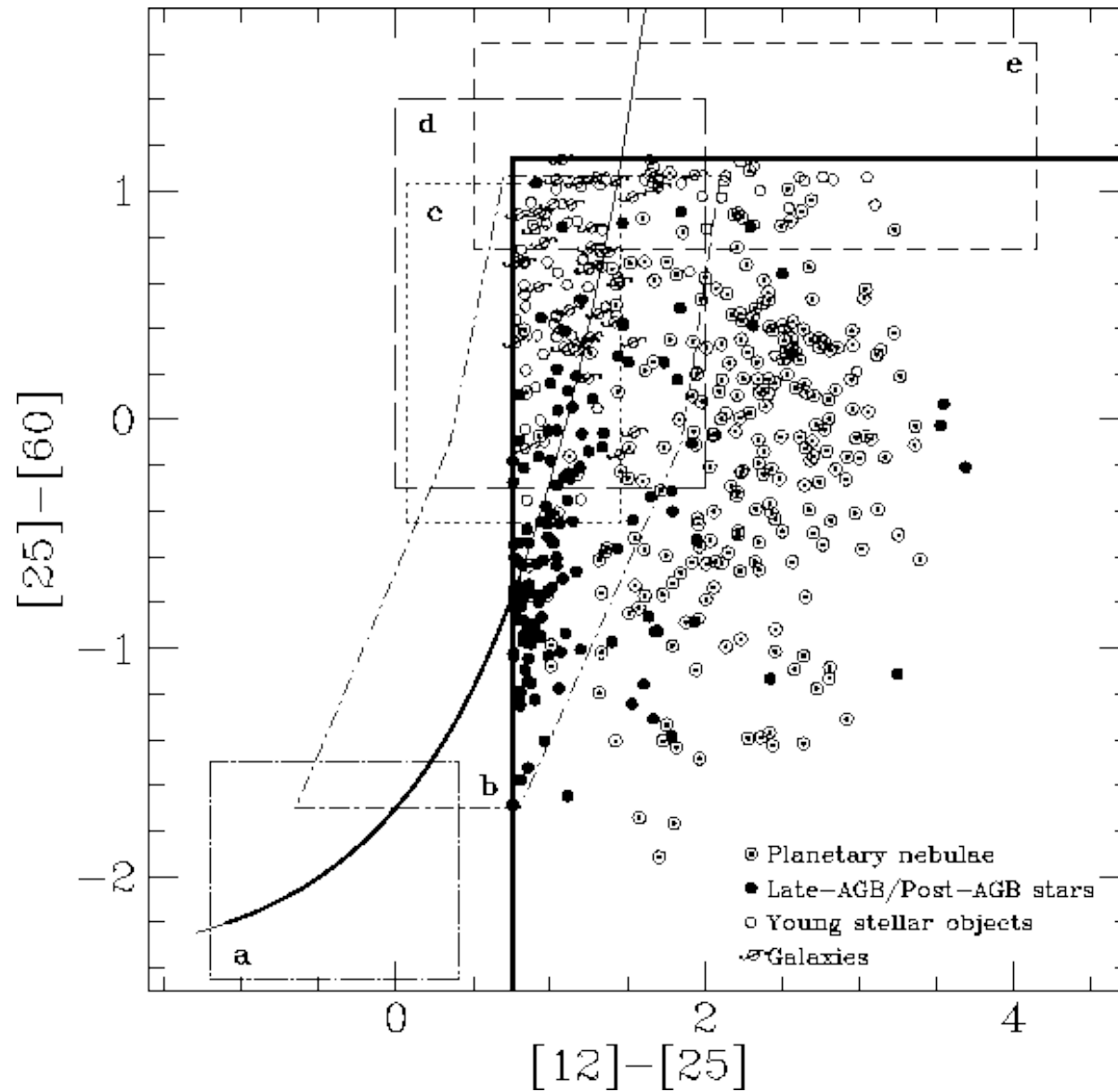
2005 AVO demo: the PPNe case



Transition phase
AGB → PN

Multiple (and
variable) components
in their SEDs

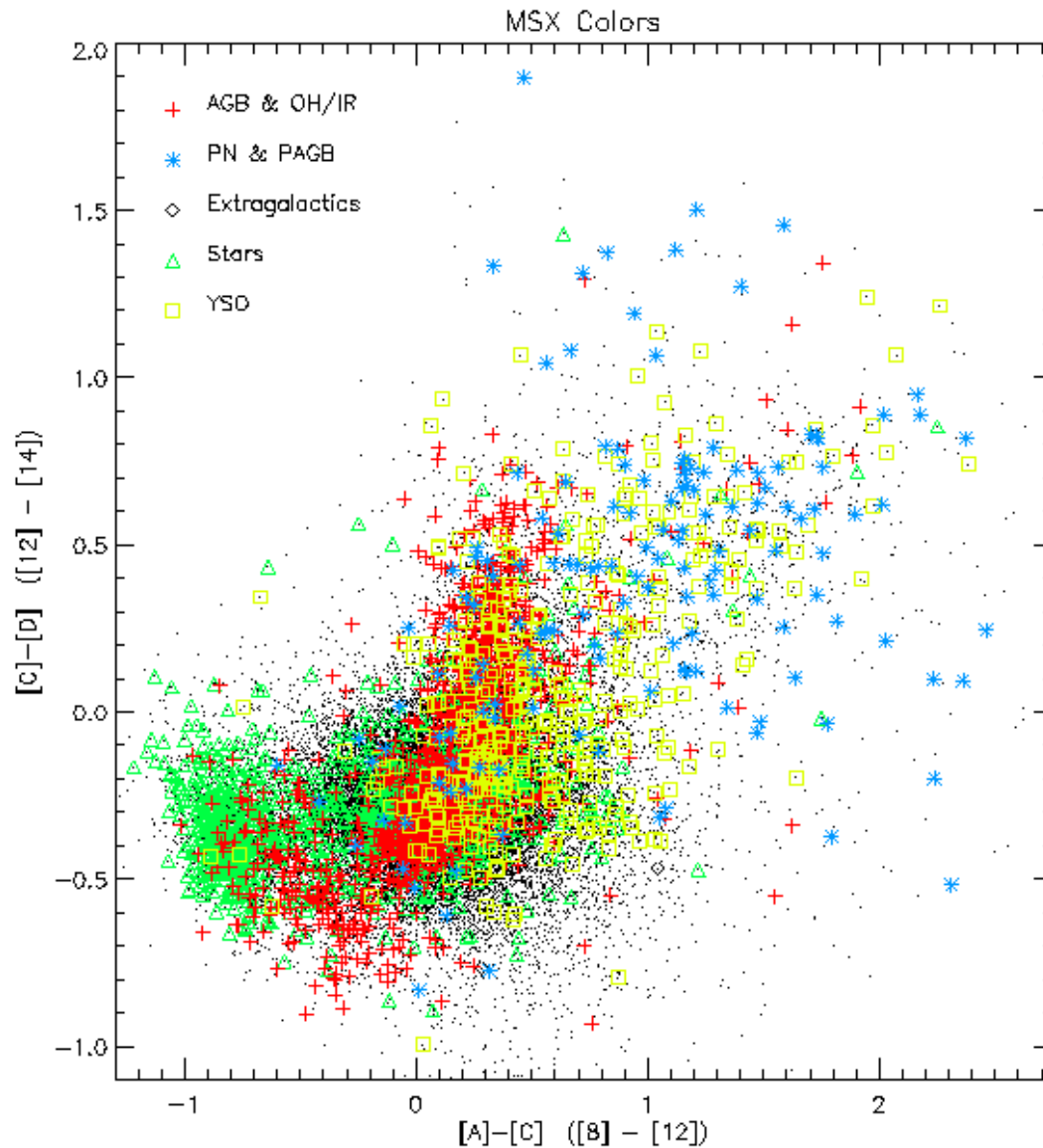
2005 AVO demo: the PPNe case



Distribution of
identified sources
in the GLMP
catalog

Garcia-Lario et al. (1997)

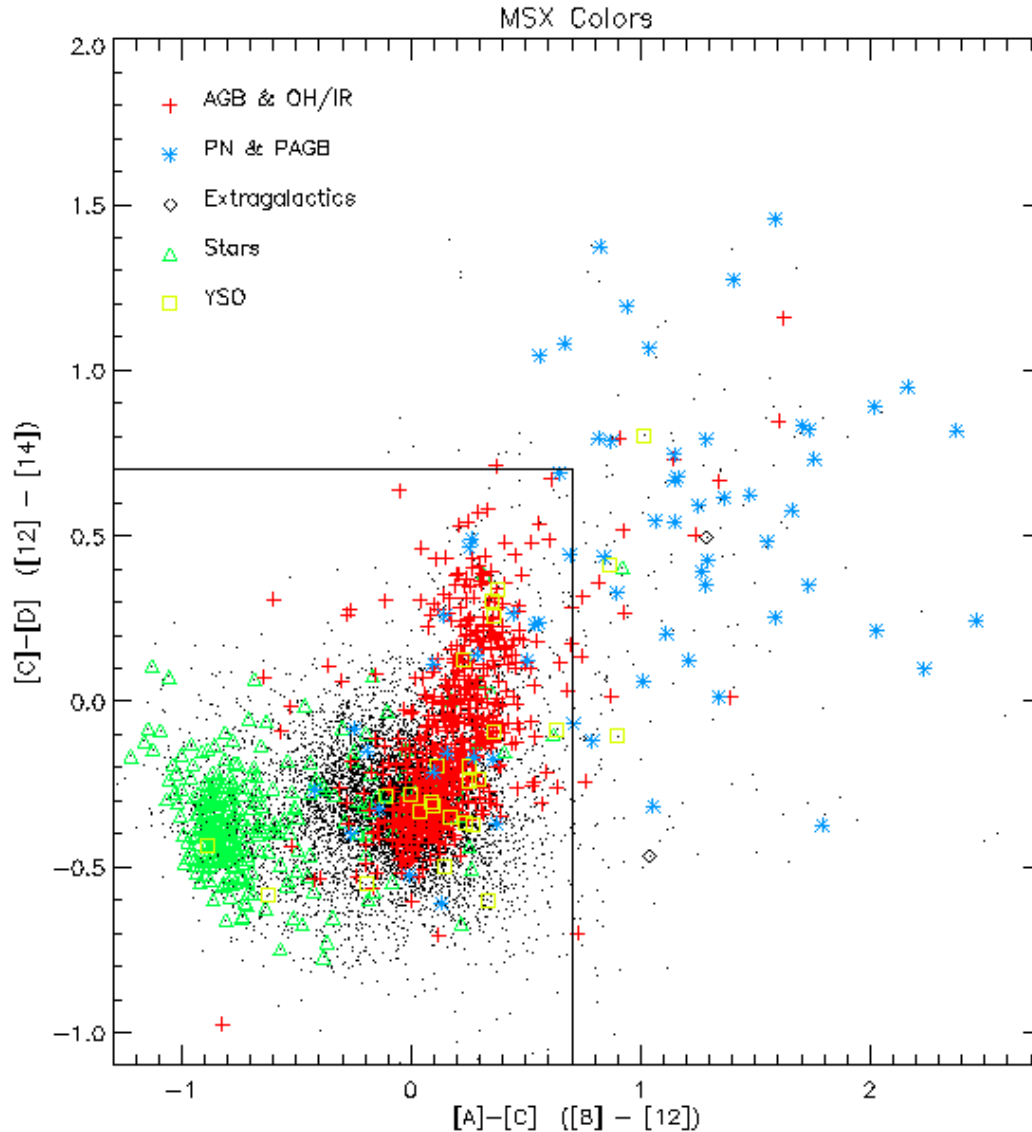
2005 AVO demo: the PPNe case



✓ 17657 sources
with good quality
MSX photometry
8-14 micron

✓ 3278 with
SIMBAD class.
✓ 155 known PNe
or Post-AGB stars
✓ Confusion with
other type of
sources

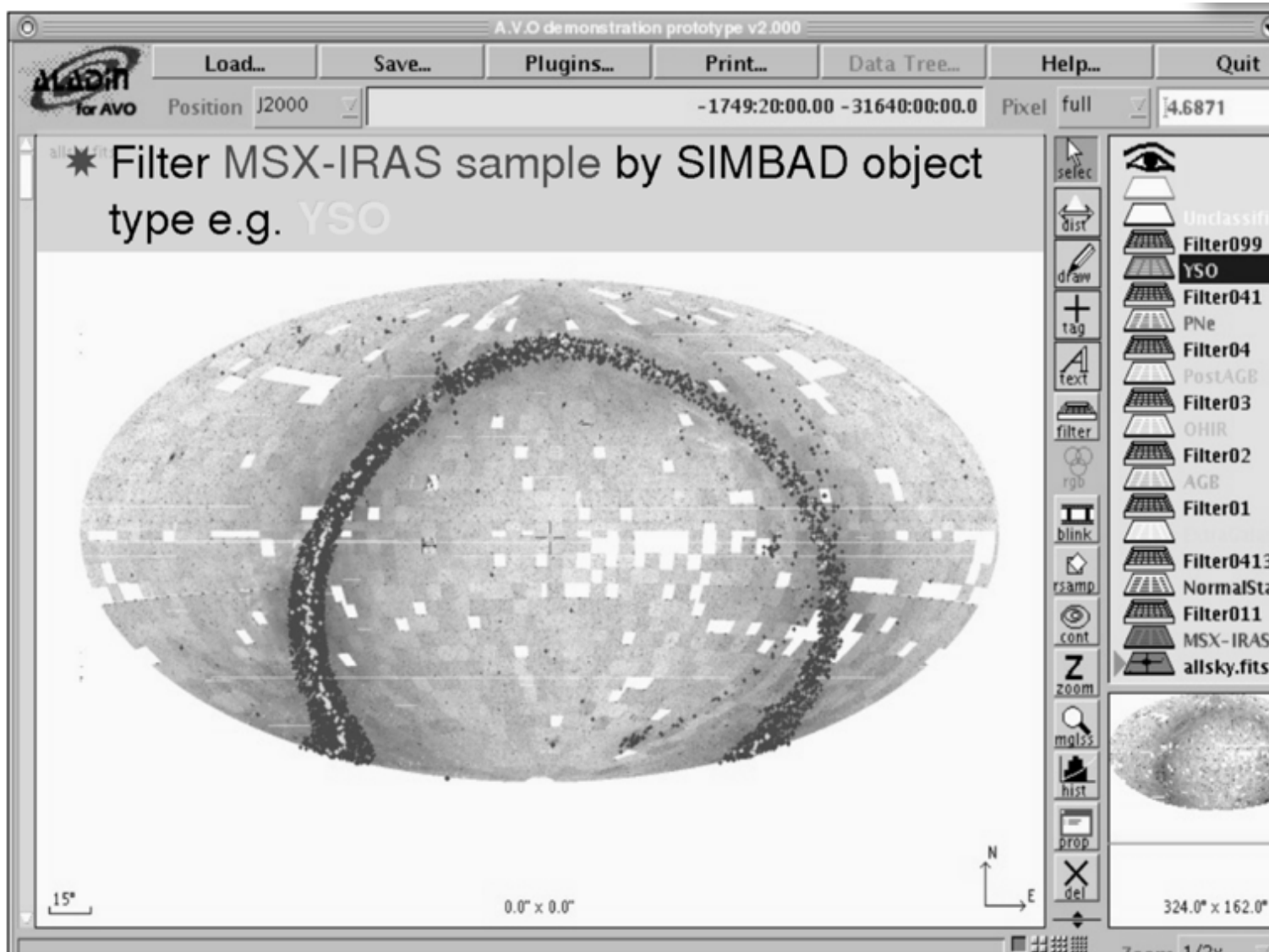
2005 AVO demo: the PPNe case



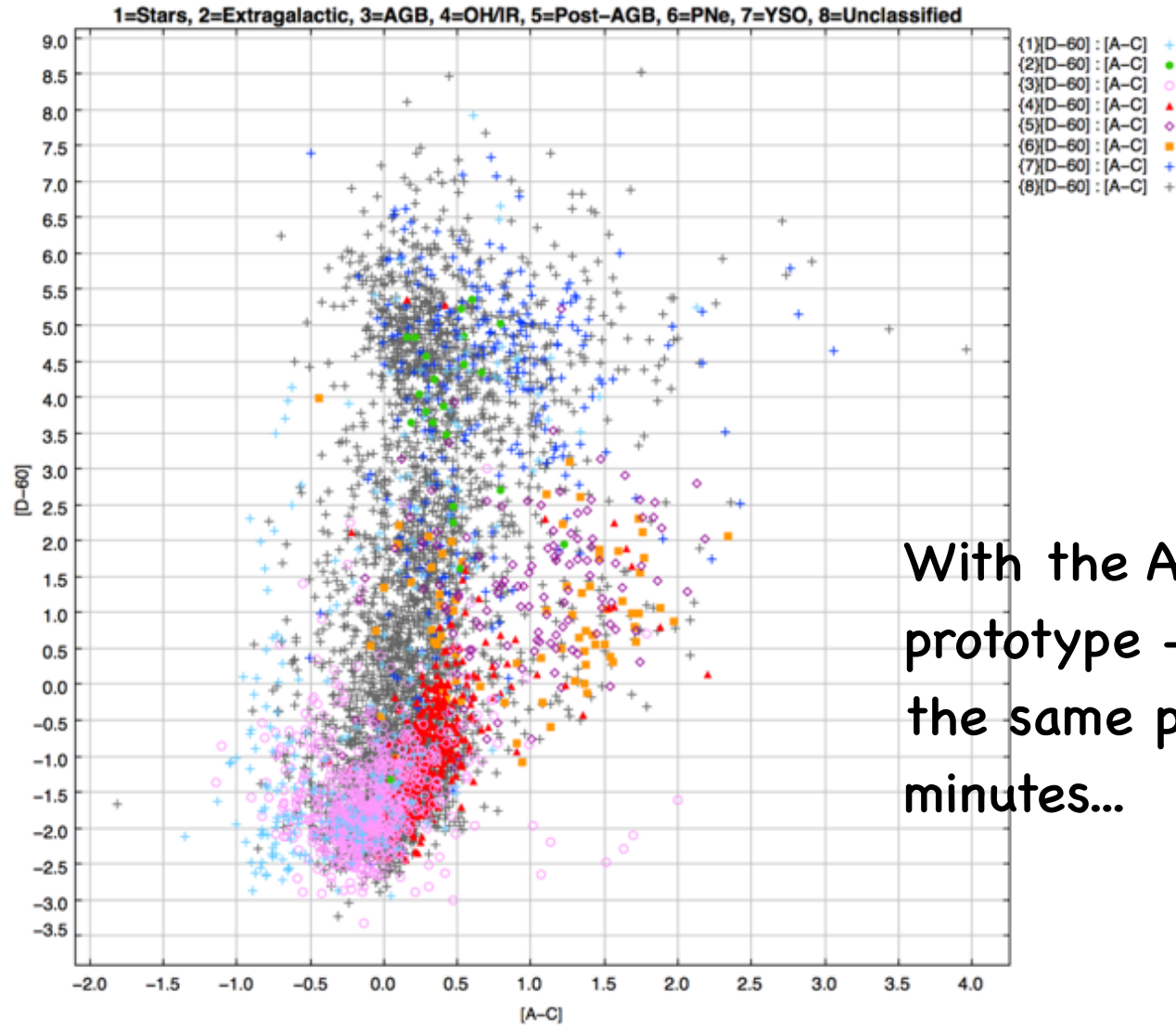
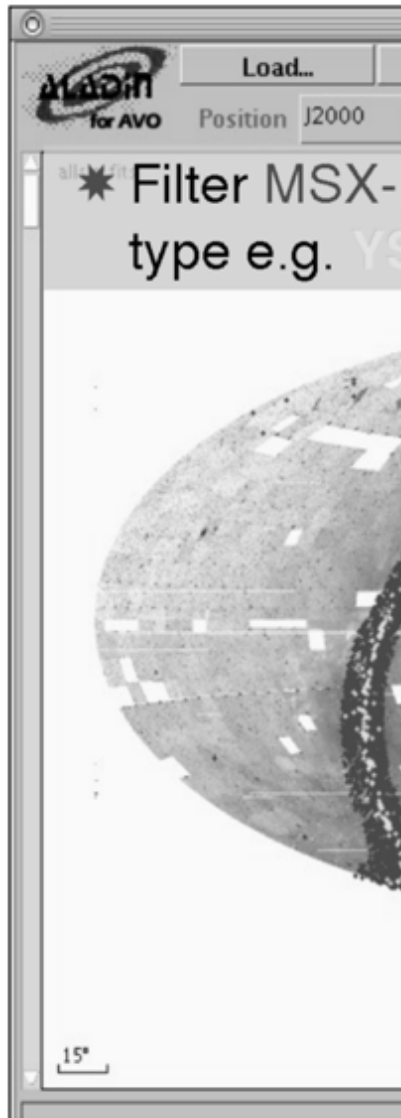
If we harden our selection criteria:
 $\sqrt{|b|} \geq 2$ degrees
 $\sqrt{[A]-[C]} \geq 0.7$
 $\sqrt{[C]-[D]} \geq 0.7$

Large majority of
PNe and Post-AGB
stars...
and many new
candidates!

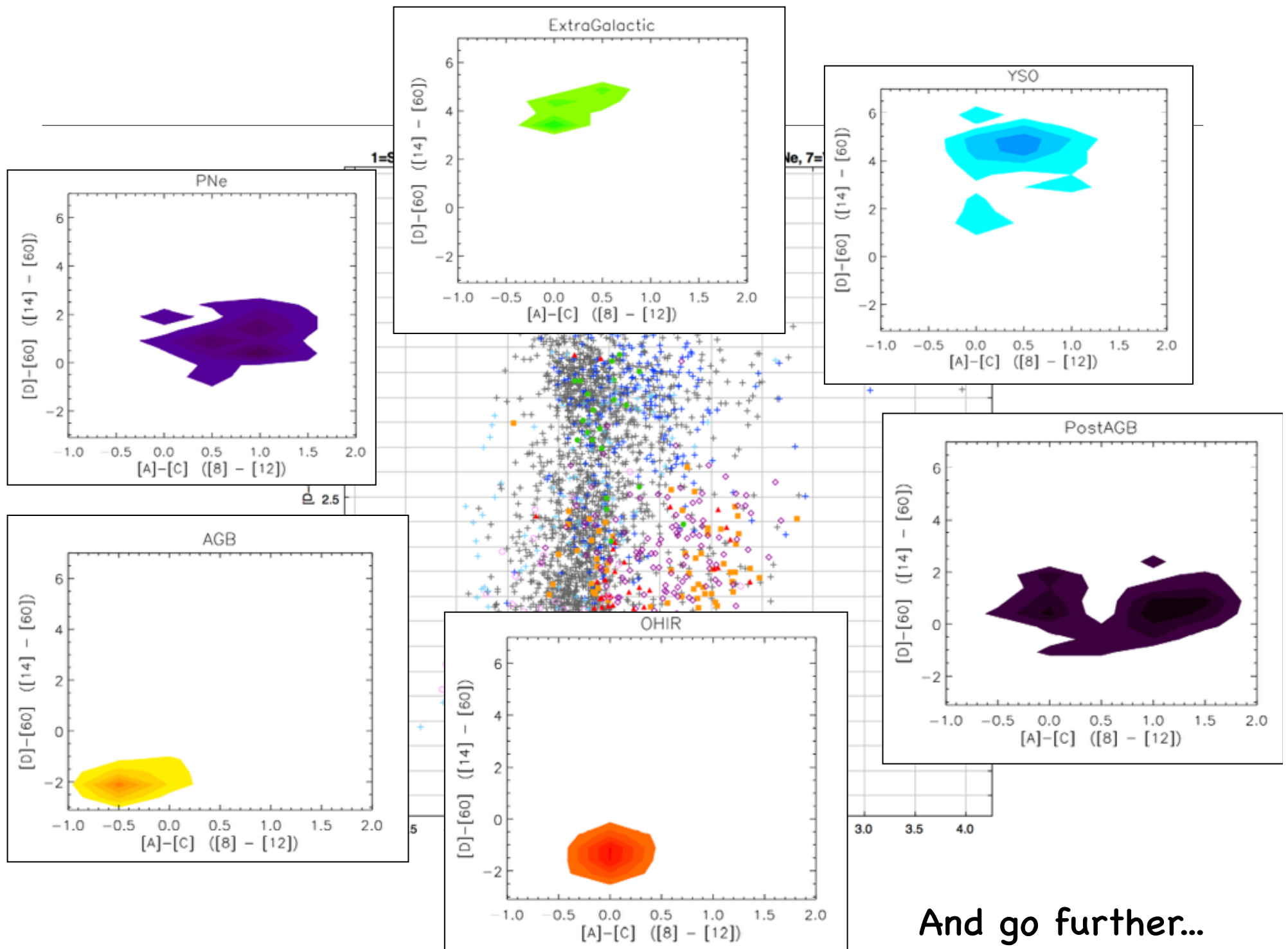
2005 AVO demo: the PPNe case



2005 AVO demo: the PPNe case



With the AVO prototype -> reach the same point in minutes...



And go further...

The happy endings...

- Data related:
 - CDS wonders vs pain of getting, for example, IOP tables
 - The “sasmirala” atlas
- Tool related (development)
 - The final AVO science demo
 - The birth of VOSA (and its continuous development)

Warning! self-promotion

✓ March 2007



Cool objects: From SED fitting to age estimation.

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²Spanish Virtual Observatory, Spain

³Centre de Recherche Astronomique de Lyon (CRAL), Ecole Normale Supérieure de Lyon, 69364, Lyon, France



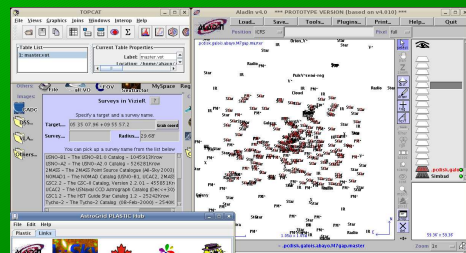
Abstract

One of the typical tools to estimate physical parameters of almost any kind of astronomical object is to perform a fitting of synthetic spectra or photometry extracted from theoretical models to observational data. This process usually involves working with multiwavelength data, which is one of the cornerstones of the VO philosophy. From this kind of studies, when combining with theoretical isochrones one can even estimate ranges of ages. We present the results from a code designed to perform χ^2 tests following two different methodologies to fit observational data: using grids of models (on their synthetic photometry), and combinations of blackbodies (including modified blackbodies). In particular, we use the models by the Lyon group. Some steps in this process can already be done in a VO environment, and the rest are in the process of development. We must note that this kind of surveys in star forming regions, clusters, etc. produce a huge amount of data, very tedious to analyse using the traditional methodology. Therefore this is an ideal example of the VO capabilities.

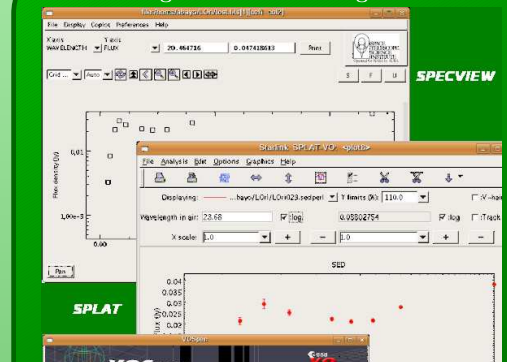
Starting point:
Your own data (photometry or spectra)

Name	I1	eI1	I2	eI2	I3	I4	eI4
1 LOrn001	10,278	0,003	10,295	0,004	10,214	0,009	10,206
2 LOrn002	9,935	0,003	10,042	0,003	9,931	0,009	9,888
3 LOrn003	10,262	0,003	10,318	0,004	10,239	0,01	10,171
4 LOrn004	10,267	0,003	10,269	0,004	10,185	0,009	10,127
5 LOrn005	10,204	0,003	10,231	0,004	10,218	0,009	10,158
6 LOrn006	10,454	0,003	10,454	0,004	10,399	0,011	10,319
7 LOrn007	10,698	0,004	10,636	0,004	10,615	0,012	10,482
8 LOrn008	10,698	0,003	10,695	0,004	10,44	0,011	10,296

Searching "non-spectroscopic" data:



Building the multiwavelength SEDs



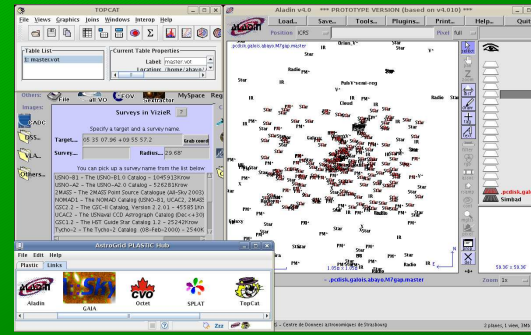
Warning! self-promotion

Starting point:
Your own data (photometry or spectra)

Name	I1	eI1	I2	eI2	I3	eI3	I4	eI4
1 LOr1001	10,228	0,003	10,255	0,004	10,214	0,009	10,206	0,01
2 LOr1002	9,935	0,003	10,042	0,003	9,93	0,009	9,88	0,008
3 LOr1003	10,262	0,003	10,318	0,004	10,239	0,01	10,171	0,01
4 LOr1004	10,287	0,003	10,249	0,004	10,185	0,009	10,127	0,009
5 LOr1005	10,204	0,003	10,321	0,004	10,218	0,009	10,158	0,009
6 LOr1006	10,454	0,003	10,454	0,004	10,399	0,011	10,319	0,01
7 LOr1007	10,668	0,004	10,636	0,004	10,615	0,012	10,482	0,013
8 LOr1008	10,498	0,003	10,495	0,004	10,44	0,011	10,296	0,012
9 LOr1009	10,834	0,004	10,873	0,005	10,788	0,012	10,743	0,014
10 LOr1010	10,916	0,004	10,953	0,005	10,733	0,012	10,839	0,016
11 LOr1011	10,378	0,003	10,521	0,004	10,444	0,011	10,326	0,011
12 LOr1012	10,619	0,003	10,758	0,005	10,627	0,012	10,543	0,012
13 LOr1013	10,511	0,003	10,48	0,004	10,467	0,011	10,344	0,012
14 LOr1014	10,902	0,004	10,904	0,005	10,839	0,014	10,797	0,014
15 LOr1015	10,808	0,004	10,886	0,005	10,824	0,013	10,882	0,015
16 LOr1016	10,833	0,004	10,817	0,006	10,378	0,011	10,7	0,014
17 LOr1017	11,165	0,005	11,206	0,006	11,173	0,017	11,072	0,019
18 LOr1018	10,804	0,004	10,798	0,005	10,722	0,012	10,636	0,014
19 LOr1019	10,89	0,004	10,866	0,005	10,767	0,013	10,788	0,018
20 LOr1020	10,676	0,003	10,609	0,004	10,573	0,012	10,485	0,012
21 LOr1021	11,129	0,004	11,107	0,005	11,081	0,016	11,065	0,019
22 LOr1022	11,01	0,004	10,985	0,005	10,895	0,014	10,683	0,014
23 LOr1023	11,09	0,004	11,114	0,005	11,071	0,015	10,928	0,018

Photometric data in four bands.

Searching "non-spectroscopic" data:



Photometric catalogues, radial velocities measurements, Simbad classification, ...

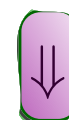
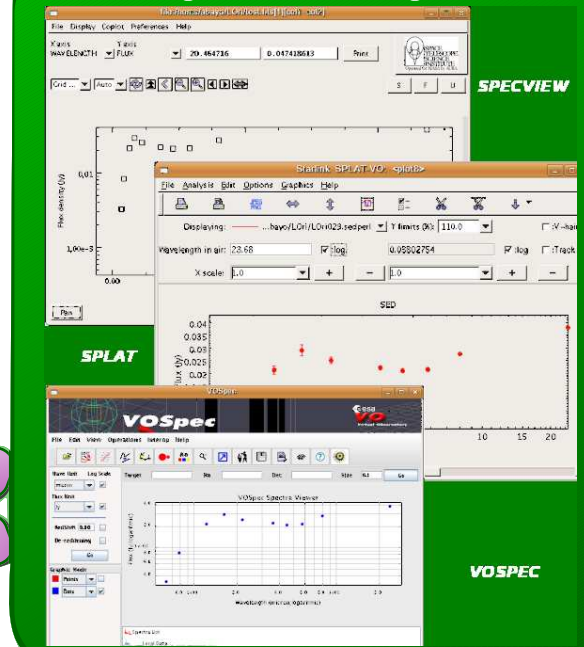
Searching spectroscopic data:

via batch mode query to VOSED.

```

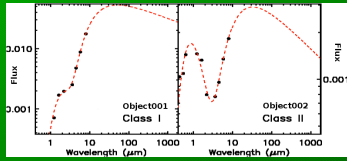
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laefi.inta.es/voled/jsp/form_search.jsp
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laefi.inta.es/voled/jsp/res_search.jsp?obj_id=83_446596&id=9_9275633
&rad=0.01&ssap_services=all&rc.uvbyeta=0&rc.zmass=0&rc.hip=0&rc.dalessio=on&submit
=Submit+Query
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
http://sdc.laefi.inta.es/voled/jsp/res_search.jsp?submitGetData=Retrieve+Marked+Data
&filas.ssap=all&filas.stromgren=0&filas.zmass=0 -0 object1.zip
    
```

Building the multiwavelength SEDs



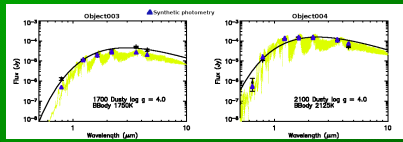
Warning! self-promotion

Blackbody fittings (combinations, modified by different β)



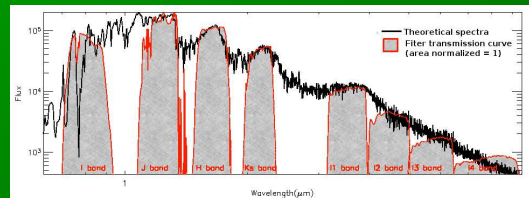
Under development

Synthetic photometry fittings



Filter selection.

Filter+Synthetic spectra = Synthetic photometry.



Obtaining synthetic spectra.

Comparison with theoretical isochrones and evolutionary tracks.

Estimation of physical parameters.

$$\log g = 4.44 + \log M(M_{\odot}) - 2 \log R(R_{\odot})$$

$$d(\text{pc}) = 2.26 \times 10^{-8} R_*(R_{\odot}) \sqrt{\frac{F_{\text{Model}}}{F_{\text{Obs}}}}$$

$$F_{\text{Obs}} = \left(\frac{MG}{gd}\right)^2 \sigma T_{\text{eff}}^4$$

And VOSA came to life!



Spanish Virtual Observatory - Theoretical models

Funded by INTA

VOSA

Sessions | Upload files | Coordinates | VO Phot. | Model Fit | HR Diag. | Save Results | Help | Logout

Upload your own data file (max size=500Kb)
It must correspond to the required data format
Please, include a description for your file, it is required

File to upload: Browse...

Description:

File type: Fluxes Magnitudes

Upload

Uploaded files

Date	Filename	Descrip	Action
19/09 11:45:00	lchozo_input_final_all_errors_corrected.asci	All errors revised	Show Retrieve Delete

L Ori001

Position: (83.446583, 9.9273611) Distance: 400. pc A_v : 0.36209598

Filter	CFHT_R	CFHT_I	2MASS_J	2MASS_H	2MASS_Ks	IRAC_I1	IRAC_I2	IRAC_I3	IRAC_I4
λ_{med}	6582	8228	12518	16504	21530	35834	45110	57593	79504
Flux:	1.447193e-14	1.345174e-14	1.048009e-14	7.583327e-15	3.061005e-15	5.502778e-16	2.128458e-16	8.649135e-17	2.543987e-17
ΔF :	5.788771e-17	5.380698e-17	9.223010e-17	6.655728e-17	2.571244e-17	6.803333e-19	3.405533e-19	3.113689e-19	1.017595e-19

L Ori002

Spanish Virtual Observatory - Theoretical models

Funded by INTA

VOSA

Sessions | Upload files | Coordinates | VO Phot. | Model Fit | HR Diag. | Save Results | Help | Logout

Theoretical spectra

- Delesio
- Coeiho
- NextGen
- cond00
- dusky00
- Kurucz

Services

- Files
- TSAP
- Photometry fit
- isochrones

VO photometry

Object			2MASS All-Sky Point Source Catalog					Tycho-2 Catalogue					Stromgren uvby-beta Catalogue (Hauck+ 1997)										
Label	RA	DEC	Save	Δ	RA	DEC	H	J	Ks	Save	Δ	RA	DEC	B	V	Save	Δ	RA	DEC	u	v	b	y
LO#001	83:28:47	9:55:38	<input checked="" type="checkbox"/>	0.31	83:28:48	9:55:38	10.595±0.022	11.297±0.022	10.428±0.021														
LO#002	84:02:35	10:08:54	<input checked="" type="checkbox"/>	0.16	84:02:35	10:08:54	10.329±0.023	11.230±0.024	10.088±0.019														
LO#003	83:58:51	9:58:31	<input checked="" type="checkbox"/>	0.35	83:58:51	9:58:30	10.725±0.022	11.416±0.023	10.524±0.023														
LO#004	83:56:53	9:45:50	<input checked="" type="checkbox"/>	0.49	83:56:53	9:45:49	10.780±0.023	11.359±0.022	10.548±0.021														
LO#005	83:28:24	9:43:08	<input checked="" type="checkbox"/>	0.14	83:28:24	9:43:08	10.549±0.022	11.378±0.022	10.354±0.023														

And VOSA came to life!



Spanish Virtual Observatory - Theoretical models

Funded by INTA

SVO

VOSA

Sessions Upload files Coordinates VO Phot. Model Fit HR Diag. Save Results Help Logout

Upload your own data file (max size=500Kb)
It must correspond to the required data format
Please, include a description for your file, it is required

File to upload: Browse...

Description:

File type: Fluxes Magnitudes

Upload

Uploaded files

Date	Filename	Descrip	Action
19/09 11:45:00	lcheno_input_inst_all_errors_corrected.asci	All errors revised	Show Retrieve Delete

L Ori001

Position: (83.446583, 9.9273611) Distance: 400. pc A_v : 0.36209598

Filter:	CFHT_R	CFHT_I	2MASS_J	2MASS_H	2MASS_Ks	IRAC_I1	IRAC_I2	IRAC_I3	IRAC_I4
λ_{med} :	6582	8228	12518	16504	21530	35834	45110	57593	79504
Flux:	1.447193e-14	1.345174e-14	1.048089e-14	7.583327e-15	3.081005e-15	5.502778e-16	2.128458e-16	8.649135e-17	2.543987e-17
ΔF :	5.788771e-17	5.380898e-17	9.223010e-17	6.655728e-17	2.571244e-17	6.803333e-19	3.405533e-19	3.113689e-19	1.017595e-19

L Ori002

Spanish Virtual Observatory - Theoretical models

Funded by INTA

SVO

VOSA

Sessions Upload files Coordinates VO Phot. Model Fit HR Diag. Save Results Help Logout

Theoretical spectra

- Delesio
- CoeHo
- NextGen
- cond00
- dusly00
- Kurucz

Services

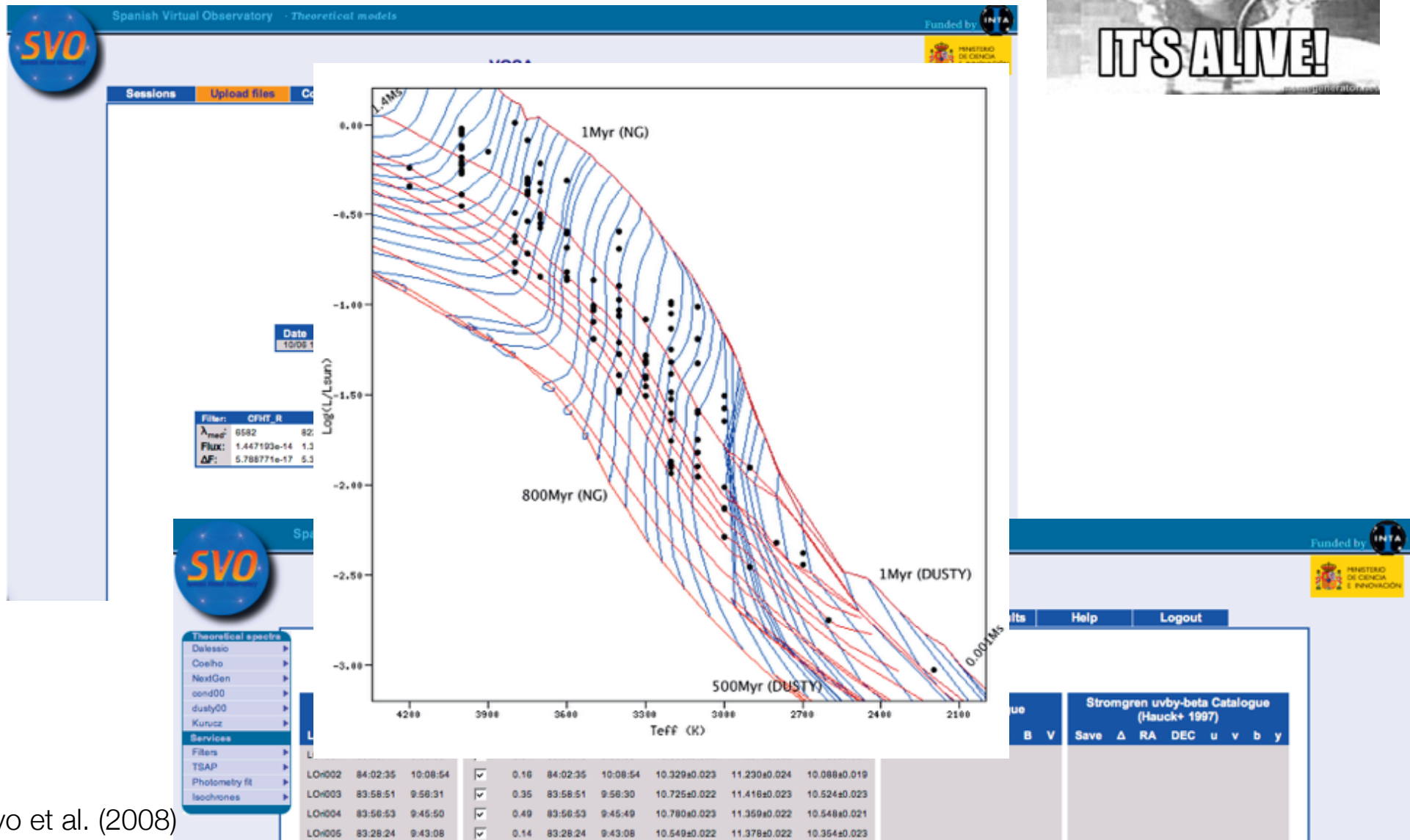
- Files
- TSAP
- Photometry fit
- Isochrones

VO photometry

Object	2MASS All-Sky Point Source Catalog			Tycho-2 Catalogue			Stromgren uvby-beta Catalogue (Hauck+ 1997)																	
	Label	RA	DEC	Save	Δ	RA	DEC	H	J	Ks	Save	Δ	RA	DEC	B	V	Save	Δ	RA	DEC	u	v	b	y
LO#001	83:28:47	9:55:38		<input checked="" type="checkbox"/>	0.31	83:28:48	9:55:38	10.595±0.022	11.297±0.022	10.428±0.021														
LO#002	84:02:35	10:08:54		<input checked="" type="checkbox"/>	0.16	84:02:35	10:08:54	10.329±0.023	11.230±0.024	10.088±0.019														
LO#003	83:58:51	9:58:31		<input checked="" type="checkbox"/>	0.35	83:58:51	9:58:30	10.725±0.022	11.418±0.023	10.524±0.023														
LO#004	83:56:53	9:45:50		<input checked="" type="checkbox"/>	0.49	83:56:53	9:45:49	10.780±0.023	11.359±0.022	10.548±0.021														
LO#005	83:28:24	9:43:08		<input checked="" type="checkbox"/>	0.14	83:28:24	9:43:08	10.549±0.022	11.378±0.022	10.354±0.023														

Bayo et al. (2008)

And VOSA came to life!



Bayo et al. (2008)

And there was room for improvement

- “Limited to” / “conceived for” stars and brown dwarfs, what about older sources? and more massive? and ~~science-fiction~~ uhhh extragalactic studies?
- Reflected in the available collections of models: Kurucz, NextGen, COND, DUSTY and not many more
- Brute force fitting but no study of the relevance of the individual parameters to the fit
- No A_V estimation
- Not design to work with a single object (input format)
- Variety of catalogs offered but you can always do better and also look for more than photometry
- No Isochrone interpolation, make it even more VO!
- Anything else in the wish-list?

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>

The screenshot displays the VOSA 2 web interface. At the top left is the SVO logo. The main header features the VOSA logo and the text 'VO SED Analyzer'. A navigation menu includes 'Files', 'Objects', 'VO Phot.', 'SED', 'Chi-2 Fit', 'Bayes Analysis', 'HR Diag.', 'Save Results', 'Log', 'Help', and 'Logout'. The current page is titled 'Stars and brown dwarfs (Change)' and shows a file named 'File: C69 only confirmed spec (Info) (Change)'. There are two main sections for data input: 'Upload your own data file (max size=500Kb)' and 'Create a single object data file'. The first section includes a 'File to upload:' field with a 'Browse...' button, a 'Description:' field, and radio buttons for 'File type' (Fluxes (erg/cm2/s/A), Fluxes (Jy), Magnitudes). The second section includes input fields for 'RA:', 'DEC:', 'Obj.Name:', and 'Description:', along with a 'Create' button. Below these sections is a table titled 'Your files' with columns for Folder, Filename, Descrip, Last Used, Obj.type, and N.Obj. The table shows one file: 'C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA' in the 'Default folder', with a description of 'C69 only confirmed spec', last used on '2013-08-26 22:02:42', and 'star' type. Below the table, there is a note 'if you change something remember to click the save button' and a 'File properties' section with details for the selected file, including its filename, upload date, last used date, object type, and number of objects. An 'Actions' section contains buttons for 'Save', 'Show Objects', 'VOSA Input', and 'Delete'.

Folder	Filename	Descrip	Last Used	Obj.type	N.Obj.
Default folder	C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA	C69 only confirmed spec	2013-08-26 22:02:42	star	171 Selected

if you change something remember to click the save button

File properties

Filename: C69_spec_confirmed_members_as_in_07_03_2013.inputVOSA
Uploaded: 2013-03-07 10:13:45
Last used: 2013-08-26 22:02:42
Obj. Type: star
N. 171

Actions

Save Show Objects
VOSA Input Delete

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>

The screenshot displays the VOSA 2 web interface. At the top left is the SVO logo. The main header features the VOSA logo and the text 'VO SED Analyzer'. A navigation menu includes 'Files', 'Objects', 'VO Phot.', 'SED', 'Chi-2 Fit', 'Bayes Analysis', 'HR Diag.', 'Save Results', 'Log', 'Help', and 'Logout'. Below the menu, the current file is identified as 'Stars and brown dwarfs (Change)' and 'File: C69 only confirmed spec (info) (Change)'. There are buttons for 'Coordinates', 'Distances', and 'Extinction'. The 'Object coordinates' section contains a description: 'This option allows you to query Sesame VO service to search for object coordinates using the object name. Take a look to the corresponding Help Section and Credits Page for more information.' Below this is a search input field labeled 'Search for Obj. Coordinates', and 'Mark all: User' and 'Unmark all: User' buttons. The main content is a table with three sections: 'Final', 'User Data', and 'Sesame'.

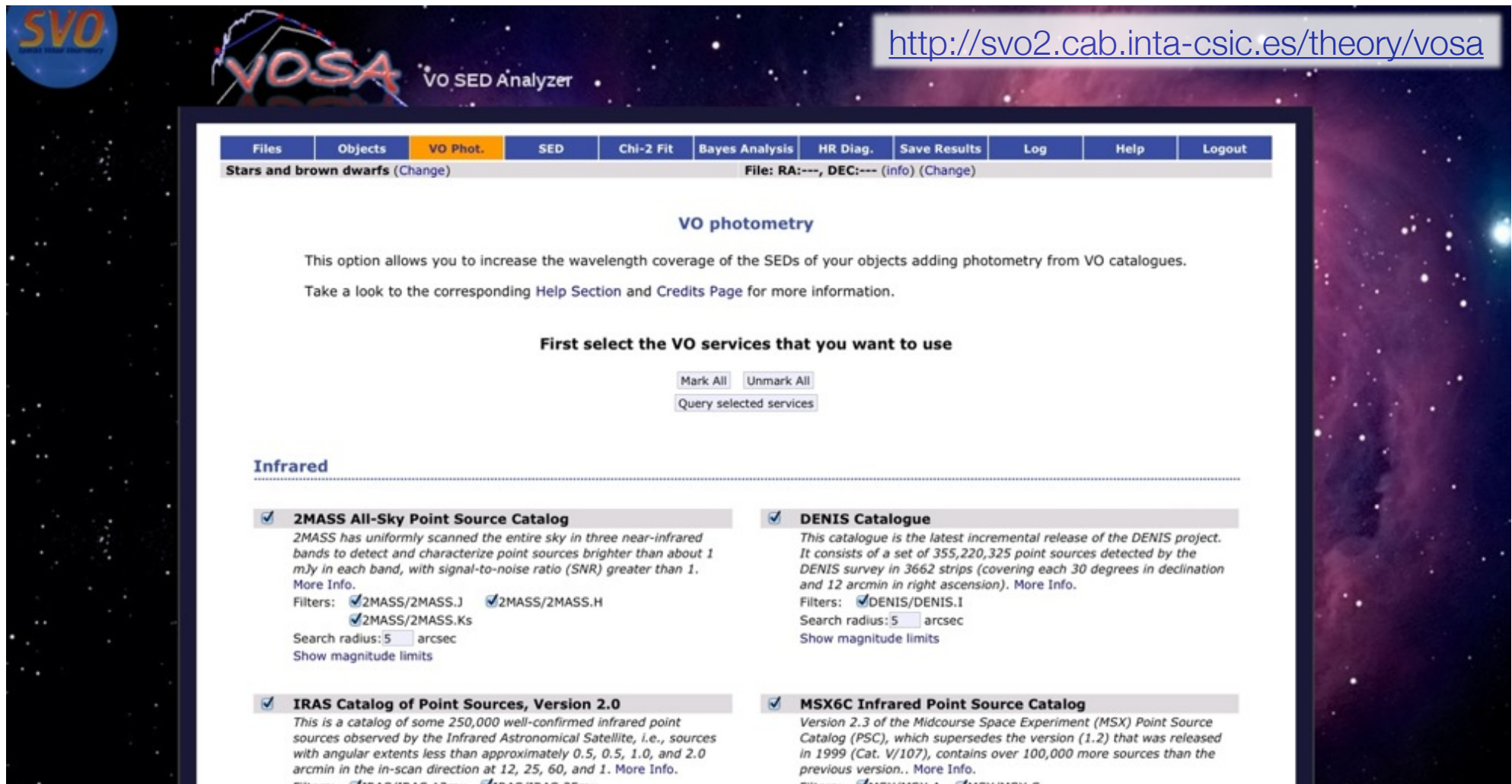
Object	Final		User Data		Sesame	
	RA (deg)	DEC (deg)	RA (deg)	DEC (deg)	RA (deg)	DEC (deg)
C69-IRAC-001	84.2339859	9.5229902	84.2339859	9.5229902	??	??
C69-IRAC-002	84.230545	9.7799978	84.230545	9.7799978	??	??
C69-IRAC-003	83.962204	9.6491137	83.962204	9.6491137	??	??
C69-IRAC-004	83.8685303	10.0409756	83.8685303	10.0409756	??	??
C69-IRAC-005	83.8555679	9.9132547	83.8555679	9.9132547	??	??
C69-IRAC-006	83.7191086	9.9305677	83.7191086	9.9305677	??	??
C69-IRAC-007	83.516304	9.8700848	83.516304	9.8700848	??	??
C69-Sub-004	83.79483333333334	9.935138888888888	83.79483333333334	9.935138888888888	??	??
C69-Sub-005	83.787916666666666	9.910027777777776	83.787916666666666	9.910027777777776	??	??
C69-X-E-104	83.98154	9.869463	83.98154	9.869463	??	??
C69XE-009	83.829475	9.9151335	83.829475	9.9151335	??	??
C69XE-040	84.209405	9.9066	84.209405	9.9066	??	??
C69XE-064	83.842427	9.8995644	83.842427	9.8995644	??	??
C69XE-072	84.444426	9.7674674	84.444426	9.7674674	??	??

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>



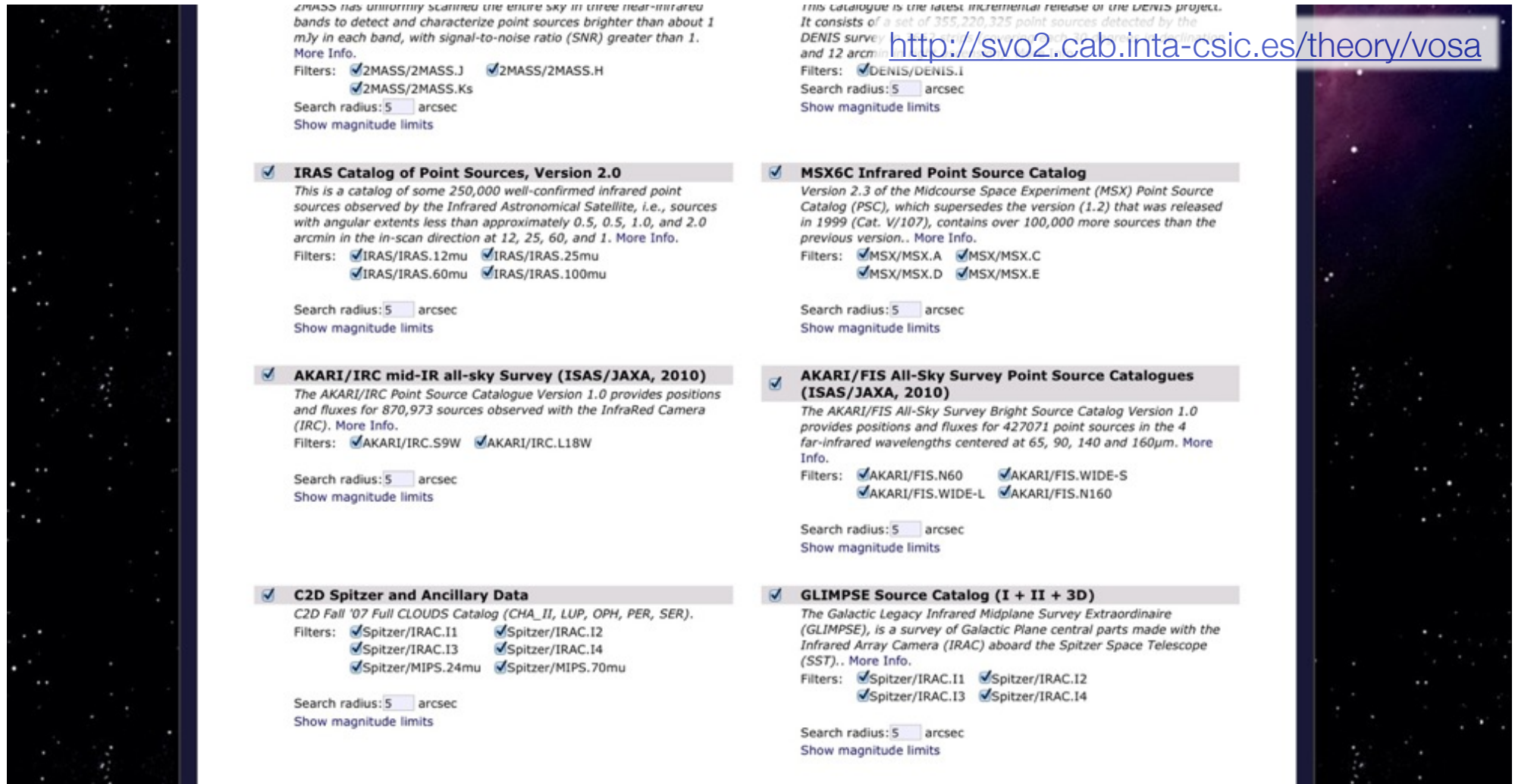
The screenshot displays the VOSA 2 web interface. At the top left is the SVO logo. The main header features the VOSA logo and the text 'VO SED Analyzer'. A navigation bar contains tabs for 'Files', 'Objects', 'VO Phot.', 'SED', 'Chi-2 Fit', 'Bayes Analysis', 'HR Diag.', 'Save Results', 'Log', 'Help', and 'Logout'. Below the navigation bar, the current page is identified as 'Stars and brown dwarfs (Change)' with a file path 'File: RA:---, DEC:--- (info) (Change)'. The main content area is titled 'VO photometry' and includes a brief description: 'This option allows you to increase the wavelength coverage of the SEDs of your objects adding photometry from VO catalogues. Take a look to the corresponding Help Section and Credits Page for more information.' Below this, a section titled 'First select the VO services that you want to use' contains buttons for 'Mark All', 'Unmark All', and 'Query selected services'. The 'Infrared' section lists four catalog options, each with a checked checkbox, a description, and filter options:

- 2MASS All-Sky Point Source Catalog**: 2MASS has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 1. More Info. Filters: 2MASS/2MASS.J 2MASS/2MASS.H 2MASS/2MASS.Ks. Search radius: 5 arcsec. Show magnitude limits.
- DENIS Catalogue**: This catalogue is the latest incremental release of the DENIS project. It consists of a set of 355,220,325 point sources detected by the DENIS survey in 3662 strips (covering each 30 degrees in declination and 12 arcmin in right ascension). More Info. Filters: DENIS/DENIS.I. Search radius: 5 arcsec. Show magnitude limits.
- IRAS Catalog of Point Sources, Version 2.0**: This is a catalog of some 250,000 well-confirmed infrared point sources observed by the Infrared Astronomical Satellite, i.e., sources with angular extents less than approximately 0.5, 0.5, 1.0, and 2.0 arcmin in the in-scan direction at 12, 25, 60, and 1. More Info. Filters: IRAS/IRAS 12mic IRAS/IRAS 25mic IRAS/IRAS 60mic IRAS/IRAS 1mic.
- MSX6C Infrared Point Source Catalog**: Version 2.3 of the Midcourse Space Experiment (MSX) Point Source Catalog (PSC), which supersedes the version (1.2) that was released in 1999 (Cat. V/107), contains over 100,000 more sources than the previous version.. More Info. Filters: MSX/MSX 1 MSX/MSX 2 MSX/MSX 3 MSX/MSX 4 MSX/MSX 5 MSX/MSX 6.

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation



The screenshot displays the VOSA 2 search interface with several survey options. Each option includes a description, filters, search radius, and a 'Show magnitude limits' button. A URL is visible in the top right corner of the interface.

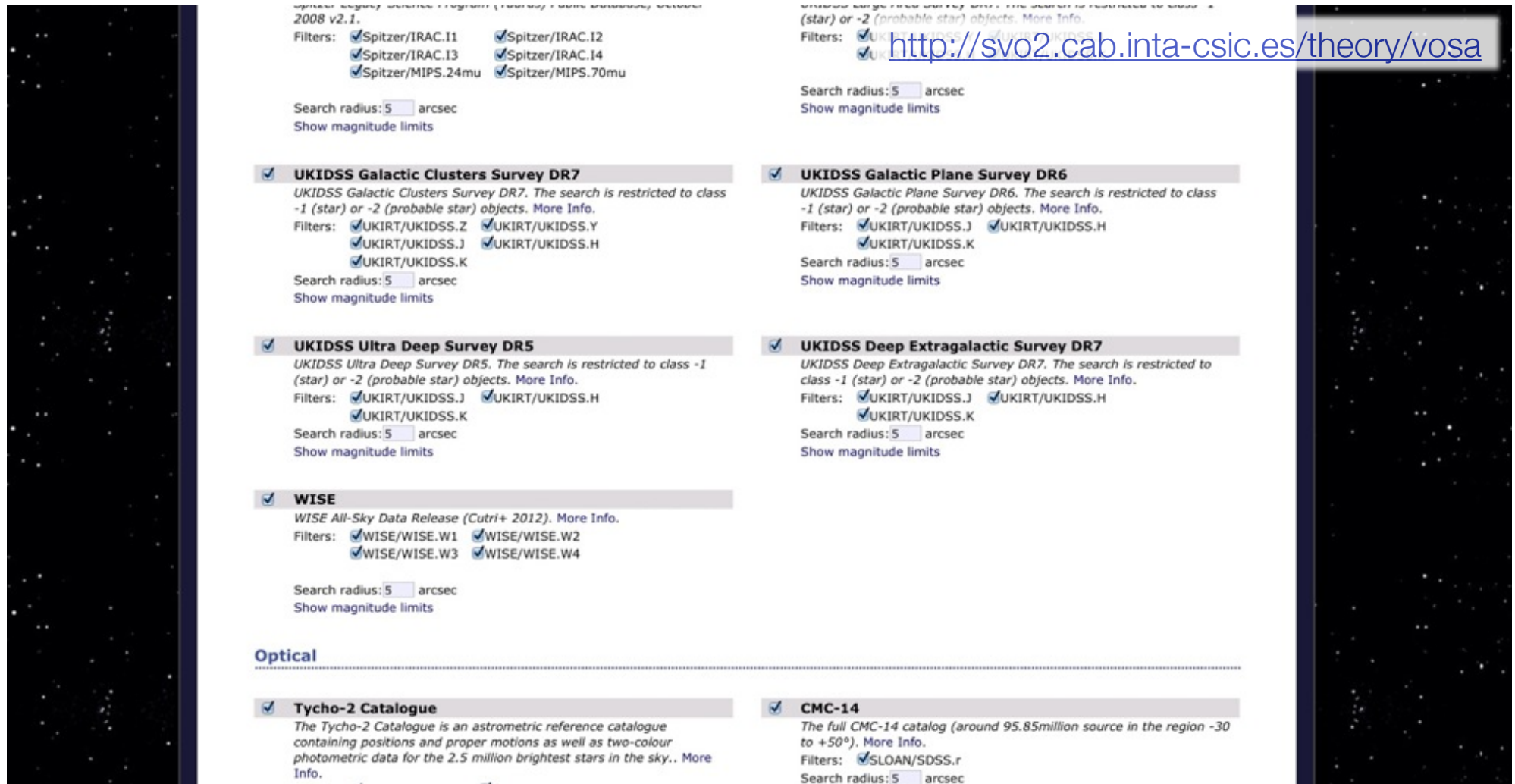
<http://svo2.cab.inta-csic.es/theory/vosa>

- 2MASS** has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 1. More Info.
Filters: 2MASS/2MASS.J 2MASS/2MASS.H
 2MASS/2MASS.Ks
Search radius: 5 arcsec
Show magnitude limits
- IRAS Catalog of Point Sources, Version 2.0**
This is a catalog of some 250,000 well-confirmed infrared point sources observed by the Infrared Astronomical Satellite, i.e., sources with angular extents less than approximately 0.5, 0.5, 1.0, and 2.0 arcmin in the in-scan direction at 12, 25, 60, and 1. More Info.
Filters: IRAS/IRAS.12mu IRAS/IRAS.25mu
 IRAS/IRAS.60mu IRAS/IRAS.100mu
Search radius: 5 arcsec
Show magnitude limits
- AKARI/IRC mid-IR all-sky Survey (ISAS/JAXA, 2010)**
The AKARI/IRC Point Source Catalogue Version 1.0 provides positions and fluxes for 870,973 sources observed with the InfraRed Camera (IRC). More Info.
Filters: AKARI/IRC.S9W AKARI/IRC.L18W
Search radius: 5 arcsec
Show magnitude limits
- C2D Spitzer and Ancillary Data**
C2D Fall '07 Full CLOUDS Catalog (CHA, II, LUP, OPH, PER, SER).
Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4
 Spitzer/MIPS.24mu Spitzer/MIPS.70mu
Search radius: 5 arcsec
Show magnitude limits
- DENIS** is the latest incremental release of the DENIS project. It consists of a set of 355,220,325 point sources detected by the DENIS survey in 17 stripes covering each 30 degree of longitude and 12 arcmin in latitude.
Filters: DENIS/DENIS.I
Search radius: 5 arcsec
Show magnitude limits
- MSX6C Infrared Point Source Catalog**
Version 2.3 of the Midcourse Space Experiment (MSX) Point Source Catalog (PSC), which supersedes the version (1.2) that was released in 1999 (Cat. V/107), contains over 100,000 more sources than the previous version.. More Info.
Filters: MSX/MSX.A MSX/MSX.C
 MSX/MSX.D MSX/MSX.E
Search radius: 5 arcsec
Show magnitude limits
- AKARI/FIS All-Sky Survey Point Source Catalogues (ISAS/JAXA, 2010)**
The AKARI/FIS All-Sky Survey Bright Source Catalog Version 1.0 provides positions and fluxes for 427071 point sources in the 4 far-infrared wavelengths centered at 65, 90, 140 and 160µm. More Info.
Filters: AKARI/FIS.N60 AKARI/FIS.WIDE-S
 AKARI/FIS.WIDE-L AKARI/FIS.N160
Search radius: 5 arcsec
Show magnitude limits
- GLIMPSE Source Catalog (I + II + 3D)**
The Galactic Legacy Infrared Midplane Survey Extraordinaire (GLIMPSE), is a survey of Galactic Plane central parts made with the Infrared Array Camera (IRAC) aboard the Spitzer Space Telescope (SST).. More Info.
Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4
Search radius: 5 arcsec
Show magnitude limits

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation



The screenshot displays the VOSA 2 web interface, which is a search tool for astronomical data. It features a search bar at the top with a URL: <http://svo2.cab.inta-csic.es/theory/vosa>. Below the search bar, there are several sections for selecting filters and surveys. Each section includes a checkbox, a title, a brief description, a list of filters, and a search radius input field. The surveys listed include Spitzer/IRAC, UKIDSS Galactic Clusters Survey DR7, UKIDSS Galactic Plane Survey DR6, UKIDSS Ultra Deep Survey DR5, UKIDSS Deep Extragalactic Survey DR7, WISE, Tycho-2 Catalogue, and CMC-14. The interface is framed by a dark blue border with a starry background.

2008 v2.1.
Filters: Spitzer/IRAC.I1 Spitzer/IRAC.I2
 Spitzer/IRAC.I3 Spitzer/IRAC.I4
 Spitzer/MIPS.24mu Spitzer/MIPS.70mu
Search radius: 5 arcsec
Show magnitude limits

UKIDSS Galactic Clusters Survey DR7
UKIDSS Galactic Clusters Survey DR7. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.
Filters: UKIRT/UKIDSS.Z UKIRT/UKIDSS.Y
 UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K
Search radius: 5 arcsec
Show magnitude limits

UKIDSS Galactic Plane Survey DR6
UKIDSS Galactic Plane Survey DR6. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.
Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K
Search radius: 5 arcsec
Show magnitude limits

UKIDSS Ultra Deep Survey DR5
UKIDSS Ultra Deep Survey DR5. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.
Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K
Search radius: 5 arcsec
Show magnitude limits

UKIDSS Deep Extragalactic Survey DR7
UKIDSS Deep Extragalactic Survey DR7. The search is restricted to class -1 (star) or -2 (probable star) objects. More Info.
Filters: UKIRT/UKIDSS.J UKIRT/UKIDSS.H
 UKIRT/UKIDSS.K
Search radius: 5 arcsec
Show magnitude limits

WISE
WISE All-Sky Data Release (Cutri+ 2012). More Info.
Filters: WISE/WISE.W1 WISE/WISE.W2
 WISE/WISE.W3 WISE/WISE.W4
Search radius: 5 arcsec
Show magnitude limits

Optical

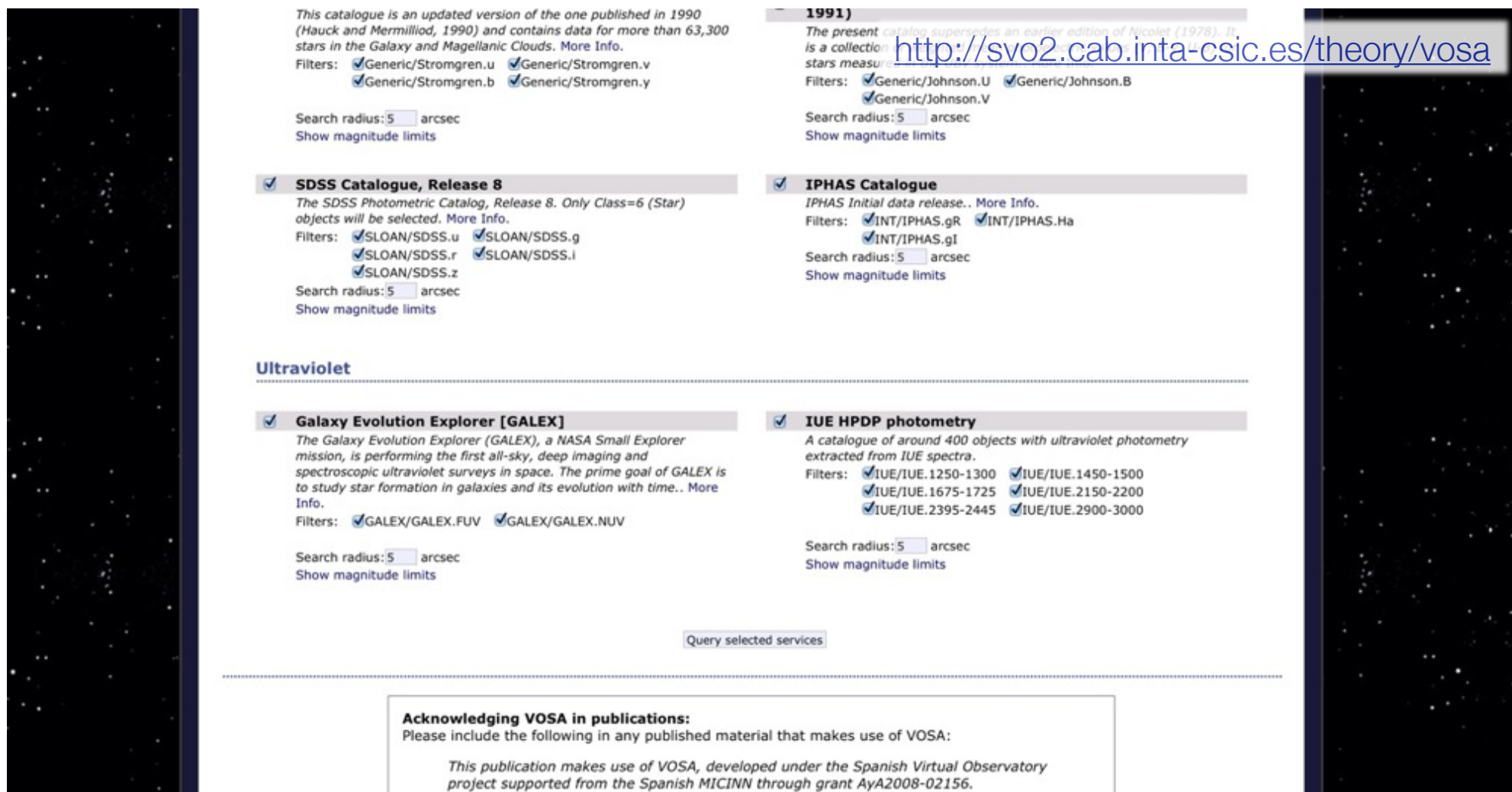
Tycho-2 Catalogue
The Tycho-2 Catalogue is an astrometric reference catalogue containing positions and proper motions as well as two-colour photometric data for the 2.5 million brightest stars in the sky.. More Info.

CMC-14
The full CMC-14 catalog (around 95.85million source in the region -30 to +50°). More Info.
Filters: SLOAN/SDSS.r
Search radius: 5 arcsec

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation



The screenshot displays the VOSA 2 web interface with several search options. At the top right, there is a URL: <http://svo2.cab.inta-csic.es/theory/vosa>. The interface is divided into sections for different catalogues, each with a description, filters, and search parameters.

1991)
This catalogue is an updated version of the one published in 1990 (Hauck and Mermilliod, 1990) and contains data for more than 63,300 stars in the Galaxy and Magellanic Clouds. More Info.
Filters: Generic/Stromgren.u Generic/Stromgren.v
Generic/Stromgren.b Generic/Stromgren.y
Search radius: 5 arcsec
Show magnitude limits

1991)
The present catalogue supersedes an earlier edition of Nicolet (1978). It is a collection of stars measured in the VOSA project.
Filters: Generic/Johnson.U Generic/Johnson.B
Generic/Johnson.V
Search radius: 5 arcsec
Show magnitude limits

SDSS Catalogue, Release 8
The SDSS Photometric Catalog, Release 8. Only Class=6 (Star) objects will be selected. More Info.
Filters: SLOAN/SDSS.u SLOAN/SDSS.g
SLOAN/SDSS.r SLOAN/SDSS.i
SLOAN/SDSS.z
Search radius: 5 arcsec
Show magnitude limits

IPHAS Catalogue
IPHAS Initial data release.. More Info.
Filters: INT/IPHAS.gR INT/IPHAS.Ha
INT/IPHAS.gI
Search radius: 5 arcsec
Show magnitude limits

Ultraviolet

Galaxy Evolution Explorer [GALEX]
The Galaxy Evolution Explorer (GALEX), a NASA Small Explorer mission, is performing the first all-sky, deep imaging and spectroscopic ultraviolet surveys in space. The prime goal of GALEX is to study star formation in galaxies and its evolution with time.. More Info.
Filters: GALEX/GALEX.FUV GALEX/GALEX.NUV
Search radius: 5 arcsec
Show magnitude limits

IUE HPDP photometry
A catalogue of around 400 objects with ultraviolet photometry extracted from IUE spectra.
Filters: IUE/IUE.1250-1300 IUE/IUE.1450-1500
IUE/IUE.1675-1725 IUE/IUE.2150-2200
IUE/IUE.2395-2445 IUE/IUE.2900-3000
Search radius: 5 arcsec
Show magnitude limits

Query selected services

Acknowledging VOSA in publications:
Please include the following in any published material that makes use of VOSA:
This publication makes use of VOSA, developed under the Spanish Virtual Observatory project supported from the Spanish MICINN through grant AyA2008-02156.

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>

Object data | Next >

C69-IRAC-001
 Position: (84.2339859, 9.5229902) Distance: 400 pc A_V : 0.
 Data for this object:

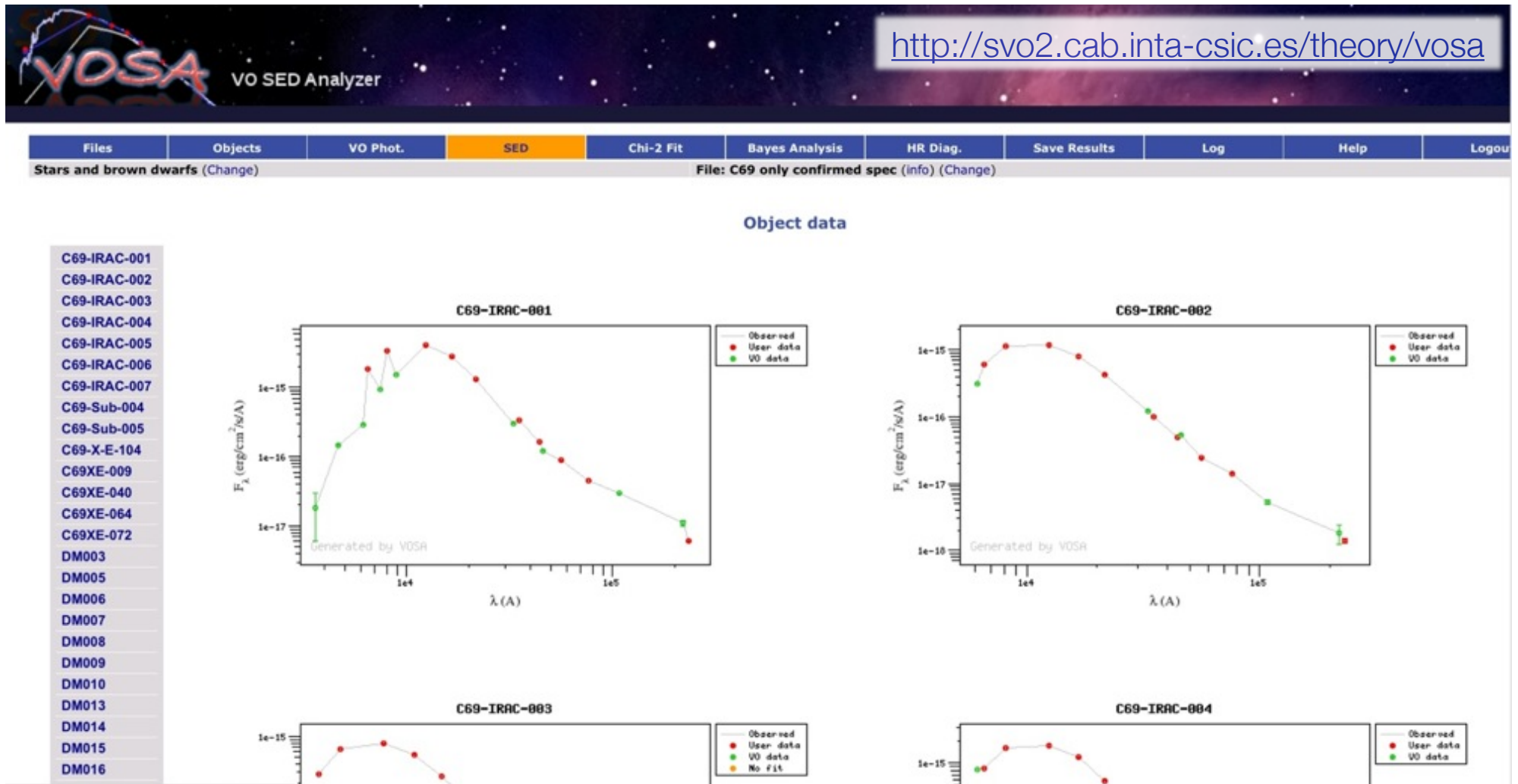
Filter	λ_{med}	Final SED			User data			VO data					
		Flux	ΔF	Flux	ΔF	NoFit	Uplim	Delete	Flux	ΔF	NoFit	Uplim	Delete
SLOAN/SDSS.u	3594.93	1.815e-17	1.205e-17	---	---				1.815e-17	1.205e-17			
SLOAN/SDSS.g	4640.42	1.471e-16	3.252e-18	---	---				1.471e-16	3.252e-18			
SLOAN/SDSS.r	6122.33	2.945e-16	2.441e-18	---	---				2.945e-16	2.441e-18			
CFHT/CFHT.R	6515.87	1.878e-15	0.000e+00	1.878e-15	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
SLOAN/SDSS.i	7439.49	9.242e-16	3.405e-18	---	---				9.242e-16	3.405e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CFHT/CFHT.I	8090.45	3.363e-15	0.000e+00	3.363e-15	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
SLOAN/SDSS.z	8897.06	1.534e-15	7.066e-18	---	---				1.534e-15	7.066e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2MASS/2MASS.J	12350.00	4.079e-15	9.769e-17	4.079e-15	9.769e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
2MASS/2MASS.H	16620.00	2.791e-15	5.913e-17	2.791e-15	5.913e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
2MASS/2MASS.Ks	21590.00	1.292e-15	2.737e-17	1.292e-15	2.737e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W1	33526.00	3.022e-16	6.401e-18	---	---				3.022e-16	6.401e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/IRAC.I1	35075.11	3.411e-16	9.424e-19	3.411e-16	9.424e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
Spitzer/IRAC.I2	44365.78	1.648e-16	4.553e-19	1.648e-16	4.553e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W2	46028.00	1.221e-16	2.361e-18	---	---				1.221e-16	2.361e-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/IRAC.I3	56281.02	8.775e-17	5.657e-19	8.775e-17	5.657e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
Spitzer/IRAC.I4	75891.59	4.529e-17	1.669e-19	4.529e-17	1.669e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			
WISE/WISE.W3	115608.00	2.959e-17	7.086e-19	---	---				2.959e-17	7.086e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WISE/WISE.W4	220883.00	1.099e-17	9.311e-19	---	---				1.099e-17	9.311e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spitzer/MIPS.24mu	232096.04	6.045e-18	1.058e-19	6.045e-18	1.058e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	---	---			

~200 regular users, cited in ~ 50 papers

Bayo et al. (2008, 2014a subm.)

VOSA 2: the new generation

<http://svo2.cab.inta-csic.es/theory/vosa>



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Bayo et al. (2008, 2014a subm.)